Direction Générale de l'Aviation Civile
Centre d'Études de la Navigation Aérienne

Complete Air Traffic Simulator

French CATS ability to model en-route traffic

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RÉPUBLIQUE FRANÇAISE
ministère de l'Équipement des Transports du Logement du Tourisme et de la Mer

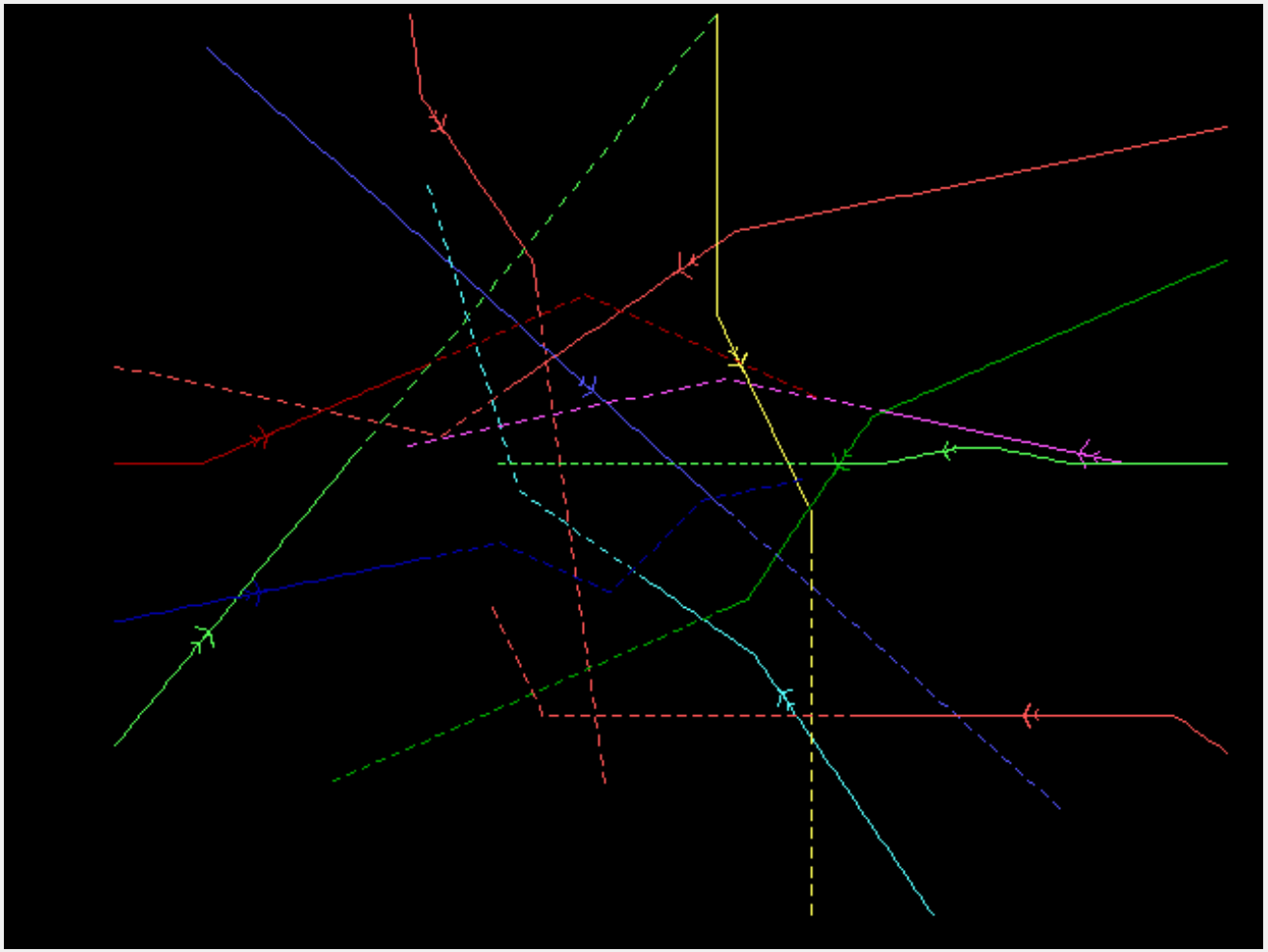
An introduction to CATS

- Developed at the French CENA
- An en-route traffic simulator to compute statistics and conduct experiments on ATM
- Similar to FACET, but
  - No graphical end (can be plugged to third party radar image analysis tool)
  - More elaborated solver models
- Next version should include TRACON airspace

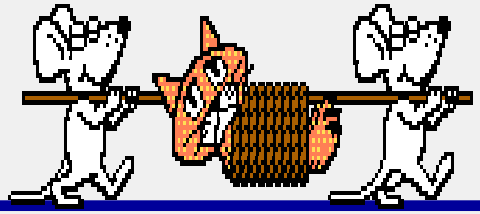
What can CATS do?

- **Fly one day of traffic, following:**
  - **Standard routes (airways)**
  - **Direct routes (great circles)**
- **Solve conflicts, using:**
  - **Standard 'ground control' solver (controller emulation)**
  - **Embarked solver (self-control prototype)**
- **Compute many statistics, to measure capacity, delays, controllers' workload, etc.**
- **Simulation on French traffic (8000 flights):**
  - ✓ **Without conflict solving: 5 minutes**
  - ✓ **With ground control solver: 1 hour**

An example of conflict resolution



Inside CATS

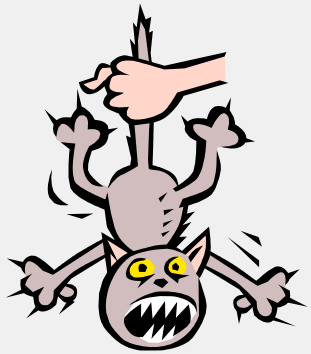


- **Core is light and easy to maintain**
- **CATS is a very realistic simulator:**
  - **Realistic plane behavior**
    - Eurocontrol plane performance tables which describe climbing rate, cruise speed, etc.
    - Plane trajectory uncertainty
  - **Realistic conflict solving**
    - 12 minutes conflict detection with uncertainty
    - Maneuvers: 30 degrees max deviation in horizontal plane, simple vertical resolution
    - All maneuvers are issued 3 minutes before execution

What to expect from CATS

- **CATS runs simulations on flight plans:**
  - **Primarily fed by French or European airspace data**
  - **My goal here is to adapt CATS for US data**
- **Analysis of US traffic**
  - **Delays**
  - **Capacity**
  - **Airspace configuration…**
- **Comparisons of European and US traffic**

Questions?



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